

REMARKS

Reconsideration of the application is requested.

Applicant acknowledges the Examiner's confirmation of receipt of applicant's certified copies of the priority documents for the German Patent Application 100 39 336.5, filed August 4, 2000 supporting the claim for priority under 35 U.S.C. § 119.

Claims 1-26 are in the application. Claims 1-16 are subject to examination and claims 17-26 have been withdrawn from examination. Claims 1 and 5 have been amended. Claim 3 has been canceled. Claim 27 has been added.

In the specification paragraph on page 3 of the above-identified Office Action, the Examiner objected to the specification because of four (4) informalities. The Examiner's suggested corrections have been made.

In the drawing paragraph on page 3 of the above-identified Office Action, the Examiner objected to the FIG. 1 because of an informality. The Examiner's suggested correction has been made.

In the claim objections paragraph on page 3 of the above-identified Office Action, claims 1 and 5 have been objected

to because of two informalities. The Examiner's suggested correction has been made.

Support for these changes may be found on pages 7, 14, and 25 of the specification and illustrated in FIG. 1 and FIG. 3 of the instant application.

It is accordingly believed that the specification and the claims meet the requirements of 35 U.S.C. § 112. The above noted changes to the claims are provided solely for the purpose of satisfying the requirements of 35 U.S.C. § 112. The changes are neither provided for overcoming the prior art nor do they narrow the scope of the claim for any reason related to the statutory requirements for a patent.

In the "Claim Rejections 35 USC § 103" section on page 4 of the above-identified Office Action, claims 1-5, 7-9, 12, and 14-16 were rejected as being obvious over United States Patent No. 5,825,192 to Hagihara (hereinafter '192) in view of United States Patent No. 5,172,053 to Itoyama (hereinafter '053) under 35 U.S.C. § 103(a).

In addition claim 6 was rejected under 35 U.S.C. § 103(a) as being obvious over United States Patent No. 5,825,192 to Hagihara (hereinafter '192) in view of United States Patent

No. 5,172,053 to Itoyama and further in view of United States Patent No. 5,525,912 to Momohara.

Similarly, claim 11 was rejected under 35 U.S.C. § 103(a) as being obvious over United States Patent No. 5,825,192 to Hagihara (hereinafter '192) in view of United States Patent No. 5,172,053 to Itoyama and further in view of United States Patent No. 5,399,983 to Nagasawa.

Finally, claims 10 and 13 were rejected under 35 U.S.C. § 103(a) as being obvious over United States Patent No. 5,825,192 to Hagihara (hereinafter '192) in view of United States Patent No. 5,172,053 to Itoyama and further in view of United States Patent No. 6,441,629 to Khoury.

The rejections have been noted and claim 1 has been amended in an effort to even more clearly define the invention of the instant application. Support for the changes is found on pages 8-13 of the specification, in the claims (e.g., claim 3), and in the drawings on Figs. 4A-4C and Fig. 7 of the instant application.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful. Claim 1 calls for, *inter alia*, a test apparatus, including

at least three actuators that are configured on the probe card for aligning the test surface profile parallel to the wafer surface profile prior to . . . contacting the wafer surface profile, the actuators also change the distance between the performance board and the contacts on the probe card in a direction substantially orthogonal to the wafer surface profile

The '192 reference discloses pushing mechanism 38 and pushing members 39 which are both passive pushing mechanisms. More specifically, Fig. 2 of '192 illustrates "an externally threaded bolt 53" that only adjusts the vertical height of the pushing mechanism 38 up or down.

The pushing members 39 connected to the pushing mechanism 38 include a coil spring 49. **After the probe card 32 touches the contacts** of the to-be-tested semiconductor wafer, the coil spring 45 of each of the pushing members 39 presses against the up-force exerted by the semiconductor wafer. Thus, the coil spring adjustments are only passive reactions to uneven contact pressure with the wafer. Therefore the alignment of the test surface profile, as defined by the bump contacts 37 of the probe card 32, is made passively during the contact operation. As a result the bump contacts 37 scrape on the wafer 12. Since the wafer surface profile is

not aligned in parallel to the test surface profile, the contact forces may be different throughout the wafer and the amount of scrubbing of the probe card contacts on the semiconductor wafer may be different throughout the wafer. In fact, '192 only adjusts alignment "to permit the probe card to be positioned in substantially a horizontal plane" (col. 10, lines 48-50) prior to contact with the to-be-tested semiconductor wafer and not **"parallel with the wafer surface profile"** as recited in claim 1.

In contrast, claim 1 requires the alignment between the probe card and semiconductor wafer and between the wafer surface profile and the test surface profile. As such, the present invention does not use passive "pushing mechanisms" that require contact to make adjustments as required in '192. Rather the present invention uses active actuators that align "the test surface profile parallel with the wafer surface profile" and change the "distance between said performance board and said contacts of said probe card in a direction substantially orthogonal to the wafer surface profile" as recited in claim 1.

This active alignment process is described in connection with figures 4A-4C of the present patent application. Because the alignment may be made before the probe card contacts engage with the semiconductor contact areas, the damage to the

semiconductor contact areas of the wafer due to various processes, such as scrubbing, may be minimized. In order to perform a parallel alignment between the test surface profile and wafer surface profile at least three actuators are necessary.

Clearly, '192 does not show at least three actuators that are configured on the probe card for aligning the test surface profile parallel with the wafer surface profile prior to contact as recited in claim 1 of the instant application. The '192 reference discloses only one threaded bolt 53, which is only used for vertical adjustment of the pushing mechanism 38. There is no desired advantage to using more than one threaded bolt 53, since the pushing members 39 perform **passive alignment** between the test surface profile and wafer surface profile **after** the probe card contacts are connected to the integrated semiconductor wafer contacts. Since the only alignment members are passive '192 cannot proactively align the probe card 32 before contacting the wafer as recited in claim 1 of the instant application.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claim 1. Claim 1 is, therefore, believed to be patentable over the art. The

dependent claims are believed to be patentable as well because they all are ultimately dependent on claim 1.

Finally, claim 27 has been added in an effort to even more clearly define one embodiment of the invention of the instant application. Specifically, claim 27 includes "a dedicated actuator for each of the contacts on the probe card to individually move the associated contact relative to the probe card." The dedicated actuators allow even more precise alignment of the contacts of the probe card with the contact areas of the integrated circuit before they are connected. As '192 does not align the test surface with the wafer surface until after contact, claim 27 is believed to be patentable over the art.

In addition, claim 27 also includes "global actuators to compensate for global tilting of the wafer or the chuck" thereby allowing the test apparatus to generally align the probe card with the integrated circuit, while the dedicated actuators compensate for individual height differences and permit the contacts to be pushed forward toward the wafer until the electrical connections are actually produced.

The newly entered claim is fully supported in the original specification on page 12 and page 13. Additional support may

be found in the claims (e.g., claim 5) and in the drawings Fig. 4A - Fig. 9. Accordingly, no new matter has been added.

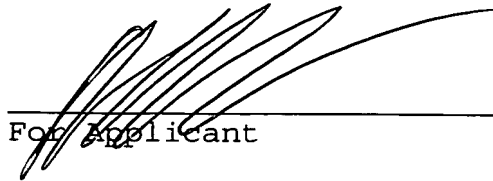
In view of the foregoing, reconsideration and allowance of claims 1-2, 4-16, and 27 are solicited.

In the event the Examiner should still find any of the claims to be unpatentable, counsel would appreciate receiving a telephone call so that, if possible, patentable language can be worked out.

Petition for extension is herewith made. The extension fee for response within a period of one month pursuant to Section 1.136(a) in the amount of \$110.00 in accordance with Section 1.17 is enclosed herewith.

Please charge any other fees that might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner and Greenberg, P.A., No. 12-1099.

Respectfully submitted,



KHF:cgm

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